

VERTEBRATE FAUNA OF THREE MOUNTAIN TOPS IN THE TOWNSVILLE REGION, NORTH QUEENSLAND: MOUNT CLEVELAND, MOUNT ELLIOT AND MOUNT HALIFAX

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Vertebrate fauna surveys were carried out on the summits of Mount Cleveland, Mount Elliot and Mount Halifax in north Queensland. The main focus was on mammals and birds, but observations on all vertebrate groups are included. Habitats included rainforest and open eucalypt/casuarina forest. The surveys recorded a total of 136 species of vertebrates including 17 mammal, 77 bird, 32 reptile and 10 frog species. Habitat descriptions and measures of relative abundance for mammals and birds are included. □ *Survey, vertebrate, mountain north, Queensland, Australia.*

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This paper reports the findings of vertebrate fauna surveys conducted on three mountain tops in the Townsville region of north Queensland. Most of the effort of the survey was directed at mammal and bird communities. However, all vertebrates were recorded and the data are included here. Reptiles, amphibians and invertebrates are dealt with in detail by Graham (1991). The fauna surveys were part of multidisciplinary fieldwork examining the suitability of Mount Elliot, Mount Cleveland and Mount Halifax for the placement of a radar tower by the Civil Aviation Authority.

Mountain top habitats are usually restricted and isolated from other patches of similar habitat. As well, there are usually endemic species associated with these restricted areas of habitat and, because endemic species were of special concern, fieldwork was mostly concentrated on the summit and the high ridges and saddles of the mountains.

The primary aim of the surveys was to provide a baseline description of the fauna of these mountain tops. Therefore, sampling was designed to record the presence of as many species as possible. This was achieved by using a variety of techniques in as many different micro-habitats (or habitat patches) as possible. Intensive sampling was conducted in each patch of different habitat within each study area. Selection of specific sub-sites was primarily based on vegetation, topography and substrate types. The vegetation classifications used were those of Walker & Hopkins (1990). Each mountain was sampled twice, during the early wet season (December 1990) and again in the early dry season (April 1991).

Previous mammal and bird surveys were carried out in the area by Lavery (1968) (birds), Lavery & Johnson (1968) (mammals), Lavery & Johnson (1974) (mammals) and Lavery & Seton (1974) (birds).

SITE DESCRIPTIONS

MOUNT CLEVELAND

Mount Cleveland (19°20'S, 147°03'E) is situated within Bowling Green Bay National Park, approximately 25km east of Townsville (Fig. 1). At 558m it is substantially lower than other mountains in the vicinity. Average annual rainfall is approximately 1000mm most of which occurs during the months December to March.

The vegetation at the summit of Mount Cleveland primarily consists of a relatively dense tree layer of *Allocasuarina torulosa* and mixed eucalypts, a dense middle layer of *Xanthorrhoea johnsonii* and a ground layer dominated by Blady Grass (*Imperata cylindrica*), over a rocky substrate.

Sub-sites selected for intensive sampling on Mount Cleveland were (topographic map used was Bowling Green 1:50 000, Sheet 8359-111, Edition 1-AAS, Series R 733):

C1 Mount Cleveland summit (Grid ref. 030706, altitude 558m). Mammal traps were laid in a circle around the summit ridge. The terrain was steep with large boulders and rock overhangs. Vegetation classification: very tall *Xanthorrhoea* shrubland above tall grassland (X4V/G3M). There was also dense vegetation, including some

rainforest taxa, in the gaps between the large boulders.

C2 Saddle between camp and summit (Grid ref. 033708, altitude 480m): the saddle was mostly flat with relatively few rocky outcrops. Vegetation classification: *Allocasuarina torulosa* dominated mid-high open forest with sclerophyll emergents over a very tall *Xanthorrhoea johnsonii* dominated shrubland (ALTOR ET6M/X4S). There were also patches of dense Blady Grass (*Imperata cylindrica*) in the more open areas.

C3 Rainforest (Grid ref. 034706, altitude 460m): Rainforest (c.2ha) was present in the catchment area of several rocky gullies just to the south of site C2. Vegetation classification: simple notophyll mixed tall closed forest (T7D S5M6).

C4 Rocky ridge (Grid ref. 036710, altitude 470m): The area was very rocky with outcrops of large granite boulders. The vegetation here is classified the same as site C2 (ALTOR ET6M/X4S), but it was much more rocky, the *Xanthorrhoea* was not as dense, and there were no significant areas of Blady Grass.

MOUNT ELLIOT

Mount Elliot (19°30'S, 146°57'E) is situated approximately 30km south-east of Townsville (Fig. 1) and, with an elevation of 1221m, is the highest mountain in the Townsville region. The group of mountains associated with Mount Elliot runs almost due north-south and hence they are influenced by the southeasterly trade-winds which blow up the Queensland coast. The area receives approximately 1200mm of rainfall annually, although the mountain top could be expected to receive considerably more than this due to its greater elevation. The majority of rainfall occurs during the months December to March.

Mount Elliot is entirely within Bowling Green Bay National Park and appears on the register of the National Estate. Unlike most areas to the north, Mount Elliot appears not to have been logged and, hence, remains relatively undisturbed. The rainforest on Mount Elliot is not contiguous with the northern forest and represents an island of forest surrounded by dry open woodland.

Sub-sites selected for intensive sampling on Mount Elliot were (topographic map used was Mount Elliot (Special), Edition 1, Series R733, 1:50 000.):

E1 (Grid ref. 109582, Altitude 1200m): narrow, steep summit ridge with Simple notophyll tall mixed closed forest with *Archontophoenix alexandrae*



FIG. 1. Map of Townsville region showing the locations of the study sites.

emergents (AT7D S5M6). This area was typical of the summit with a rocky substrate and a well developed understorey vegetation.

E2 (Grid ref. 109581, Altitude 1200m): ridge top clearing, classified as Dwarf closed vineland with *Archontophoenix alexandrae* and *Cyathea* sp. emergents (AL4D). This site was representative of a number of similar clearings near to the summit of Mount Elliot, with a very dense ground cover of vines and scramblers about 1m thick. There is virtually no canopy except an occasional palm.

E3 (Grid ref. 112576, Altitude 1150m): wide ridge top with Simple notophyll mixed very tall closed forest (T8D S5M2). The vegetation at this site has a more open understorey than site E1.

E4 (Grid ref. 114574, Altitude 1150m): headwaters of eastern catchment area. The forest here was taller with fewer small saplings and a distinctive middle layer of the tree fern *Cyathea rebecca*. Classification was Simple notophyll mixed very tall closed fern forest (T8D S5M2).

MOUNT HALIFAX

Mount Halifax (19°07'S, 146°22'E), situated 50km west north-west of Townsville (Fig. 1), is the highest mountain, at 1064m, in the Paluma Range. It is a very wet area and the average annual rainfall for the region is approximately 2600mm, with the majority falling during the period December to March.

Sub-sites selected for intensive sampling were (Map used was Rollingsstone, Series R733, Sheet 8159 1, Edition 3-AAS 1:50 000):

H1 (Grid ref. 341862, Altitude 1020m): wet, ridge-top rainforest (very wet due to almost continuous cloud drip) - the SE ridge from the summit.

Vegetation Classification: Simple Notophyll Mixed Tall Closed Forest T7D S5M6.

H2 (Grid ref. 340863, Altitude 1040m): drier rainforest on the western slope of the SE ridge. Vegetation classification: T7D S5M6.

H3 (Grid ref. 344861, Altitude 1020m): taller rainforest on narrow ridge and saddle SE of camp. Vegetation classification: Simple Notophyll Mixed Very Tall Closed Forest T8D S5M6.

H4 (Grid ref. 342862, Altitude 1040m): heath vegetation near summit ridge. Vegetation classification: mid-high *Leptospermum amboinense* Open Forest above a tall sparse heathland and mid-high closed forland LEAMB T6M/Z4V/F2D.

H5 (Grid ref. 339864, Altitude 1060m): dense, low sclerophyllous vegetation on summit. Vegetation classification: Dwarf *Callistemon viminalis* closed forest with sclerophyll emergents above a mid-high closed forland (ET4D/F2D).

METHODS

IDENTIFICATION

Voucher specimens of mammals, reptiles and amphibians that were difficult to identify were collected and lodged with the Queensland Museum (mammals) or with Queensland National Parks and Wildlife Service (reptiles and amphibians). Catalogue numbers are as yet unavailable as not all of the material has been sorted. Species worthy of special mention here are those bird observations which are range extensions (Victoria Riflebird, *Ptiloris victoriae*, Grey-Headed Robin, *Heteromyias cinereifrons*, Bridled Honeyeater, *Meliphaga frenata*, and Bower's Shrike-Thrush, *Colluricincla boweri*), and the small mammals *Rattus fuscipes* and *Melomys cervinipes*. No voucher specimens of birds were taken. Observations of Grey-Headed Robins and Bridled Honeyeaters were numerous and reliable, however only one sighting was made of Victoria's Riflebird and Bower's Shrike-thrush. *Rattus fuscipes* is very similar to *R. leucopus*. However, several skulls were examined from Mount Halifax and Mount Elliot and these proved to be *R. fuscipes*. In addition, two adult females on Mount Elliot had eight nipples (*R. fuscipes* has eight nipples while *R. leucopus* has six). As well, several specimens of *Melomys cervinipes* were identified on the basis of molar dentition and in the field on weight, fur texture and fur colour. The average weight of *M. cervinipes* on Mount Cleveland was 85g with an adult range of 70-115g. This differs from the range of 45-65g for *M. burtoni* (Strahan, 1983). Obviously these identifications

do not preclude the possibility of either *Rattus leucopus* or *Melomys burtoni* being present. Also there is considerable evidence showing that in north Queensland *M. cervinipes* is a forest generalist rather than a closed forest specialist and has much broader habitat preferences than previously thought (Winter et al., 1984; Williams, unpub. data).

MAMMAL TRAPPING

All of the sub-sites were trapped for four consecutive nights on each trip. Sub-sites C1, C2, C3 and C4 (Mount Cleveland) and sub-sites E1, E2, E3 and E4 (Mount Elliot) all had 25 Elliot "type A" traps and five wire cage "bandicoot" traps. Sub-sites H1, H2 and H3 (Mount Halifax) had 20 Elliot traps, while sub-site H4 and H5 had 10 Elliot traps and two cage traps. Traps were placed at 10m intervals with cage traps equally spaced along the transect. Traps were baited with a mixture of rolled oats, peanut butter and vanilla essence. Cage traps were also baited with sardines to attract carnivores (e.g. quolls). Two drift fence/pit trap lines were set up at Mount Elliot and Mount Halifax. Each drift fence consisted of 50m of fence (30cm high) with six pit traps (20 litre plastic drums) at about 7m intervals.

Data collected from trapped animals included species, sex, reproductive status and weight. Each animal was marked with a small notch in the right ear and then released.

BIRD OBSERVATIONS

A walking transect (c.20min) was conducted at each sub-site for four consecutive mornings (in conjunction with clearing the mammal trap lines). An additional afternoon search (c.2hr) was conducted at each sub-site. This search included observations of birds, reptiles and amphibians. Three dawn choruses (1hr) per trip were also conducted at each mountain. All incidental bird observations were also recorded. Due to the high mobility of birds and the relatively short distance between sub-sites the avifauna was not separated into the different sub-sites for each mountain.

WALKING TRANSECTS

Night

Spotlighting transects of 1-1.5hr were conducted in each of the sub-sites on each mountain on both trips for mammals, birds, reptiles and amphibians. Two spotlights (30w) were used in each survey.

Day

Daylight walking transects of c. 2hr were con-

ducted each day (once at each sub-site) to search for birds and reptiles.

RESULTS

Mount Halifax had the highest diversity of birds (55 species) (Table 1) and ground-dwelling mammals (seven species) with Mount Cleveland having the greatest diversity of reptiles (18 species). Mount Elliot was notable in that it had the lowest observed diversity of all groups (Table 1).

The diversity of terrestrial vertebrates observed during these surveys is summarised in Table 1 and a complete species list with an index of relative abundance for each species (mammals and birds) is given in Appendix 1. Detailed mammal trapping results for each sub-site are included in Appendix 2.

MT CLEVELAND

There were considerable differences between the small mammal assemblages of each sub-site on the upper ridges of Mount Cleveland (appendix 2):

- (1) The summit (site C1) and the rocky ridge (site C4) supported a small mammal assemblage consisting of *Dasyurus hallucatus*, *Melomys cervinipes*, *Isodon macrourus*, and *Petrogale inornata*. Neither *D. hallucatus* or *P. inornata* were observed at the other sites. This is not surprising given the preference of these species for rocky habitat.
- (2) Site C2 was dominated by *Melomys cervinipes*. Its density was very high at this site (20 individuals) with new individuals still being trapped after four days. The high density of *Xanthorrhoea* could be one of the factors contributing to this because several individuals of *M. cervinipes* were observed nesting within the head of the grass trees and also eating the seeds. No *D. hallucatus* or *P. inornata* were observed in this habitat.
- (3) The rainforest (site C3) contained fewer *Melomys cervinipes* in comparison to the other sites. This area may be more important during the dry season when water is not readily available in the drier areas.

Forty-three species of birds were observed on Mount Cleveland (Appendix 1). There was a much higher level of bird activity in, and on the edge, of the rainforest than elsewhere on the mountain. Generally the bird community was typical of the open forest of the Townsville region. However, due to the presence of the rainforest patch, there were also a number of closed forest species present (e.g. Scrub Turkey, Purple-

crowned Pigeon, Wompoo Pigeon, Noisy Pitta, and Bower's Shrike-thrush).

MT HALIFAX

The summit area of Mount Halifax was found to have a mammal community typical of rainforest in this region (Appendix 1 and 2). The rainforest small mammal community was dominated by *Rattus fuscipes* and the small patches of heath vegetation were dominated by *Melomys cervinipes*.

There were several species which were expected but were not observed during the field surveys. These include the Red-legged Pademelon (*Thylogale stigmatica*), Brushtail Possum (*Trichosurus vulpecula*) and Green Ringtail (*Pseudochirops archeri*).

There were several small areas of heath that were of local significance (summit - grid ref. 339864 and near campsite - grid ref. 342862). The heath represented a very different habitat from the surrounding rainforest and, as such, significantly increased the habitat diversity of the area. Although the areas were probably too small to support vertebrates unique to that habitat, such as mammals and birds, there was a significantly different small mammal community present (compare sites H4 & H5 to sites H1, H2 & H3 in Appendix 2). It is also highly likely that these patches of heath would support restricted and endemic invertebrates (Graham, 1991). The heath contained concentrations of myrtaceous plant species such as *Leptospermum amboinense* and *Callistemon* sp., which could be an important seasonal food source for nectivorous birds and mammals.

MT ELLIOT

The results of the mammal trapping indicate that the Mount Elliot rainforest has a relatively depauperate small mammal community (Appendices 1 and 2). Only two species, *Rattus fuscipes* and *Melomys cervinipes* were trapped regularly and only in low numbers (Appendix 2). A single *Planigale maculata* was caught in an insect formalin trap. No sampling was conducted in the open forest; however this area was sampled by Lavery & Johnson (1974).

DISCUSSION

The three mountains examined differ considerably in topography and vegetation. These differences are reflected in relative abundances and species diversities of mammals and birds. Gra-

TABLE 1. Diversity of vertebrates by taxonomic group for Mount Cleveland, Mount Halifax and Mount Elliot

VERTEBRATE GROUP	MOUNT CLEVELAND	MOUNT HALIFAX	MOUNT ELLIOT
MAMMALS			
Families	6	4	3
Species	9	7	5
BIRDS			
Families	20	24	16
Species	43	55	31
REPTILES			
Families	8	6	5
Species	18	10	7
AMPHIBIANS			
Families	2	3	3
Species	5	5	4
TOTALS			
Families	36	37	27
Species	75	77	45

ham (1991) has previously discussed the survey of reptiles and amphibians from this expedition. Mount Halifax had the most diverse vertebrate fauna overall, as might be expected from its position, which is contiguous with other mountains and comparable habitats in the Paluma range. Small patches of heath near the summit of Mount Halifax may increase the habitat heterogeneity enough to produce endemic arthropods (Monteith, pers. comm.), but the areas are probably too small to have a significant effect on vertebrate communities. Both Mount Cleveland and Mount Elliot are discrete mountains in which it may be expected that diversities would be lower due to smaller, more isolated summit habitats. The relatively high diversity at Mount Cleveland is probably due to high habitat heterogeneity on the summit ridges.

Mount Cleveland is an important part of Bowling Green Bay national park as the habitat on and near the summit is unique within the park and is not well represented elsewhere in the region. The habitat on the upper ridges (*A. torulosa*/*Xanthorrhoea* forest ALTOR ET6M/X4S) is not wide-

spread and contains a faunal community which is unusual (*Dasyurus hallucatus* and a high density of *Melomys cervinipes*). This community/habitat is therefore of significant importance to biological conservation both within this national park, and to the region. Patches of closed forest (e.g. site C3) are of great local significance as they greatly increase the diversity of habitats and the associated flora and fauna (as can be seen by the presence of a number of rainforest birds) although the much larger area of closed forest on nearby Mount Elliot is probably of greater regional significance.

The summit of Mount Elliot contains the largest block of rainforest within the Bowling Green national park and is regarded as being the southern limit of tropical rainforest proper (Winter & Atherton, 1987). The vertebrate fauna and flora surveys undertaken during this study also indicate that the rainforest on Mount Elliot has a high degree of affinity with the tropical rainforest to the north of Townsville. Taxa collected or noted by previous studies (Lavery 1968; Lavery & Johnson 1968; Lavery & Johnson 1974; Lavery & Seton, 1974) also indicate strong affinities with the rainforests along the Paluma Range to the north. There is one microhylid frog, *Cophixalus mcdonaldi*, endemic to the rainforest of Mount Elliot (Nix & Switzer, 1991; Zweifel, 1985). Very little is known about the biology of this very restricted species. *C. mcdonaldi* was calling during December and it appeared to be very common throughout the forest on the summit of Mount Elliot. Eight individuals were found during March by actively searching (three in rotted tree stumps, one in a crack between rocks, two under a flat rock and two sitting on a clutch of at least eight eggs inside a small (2cm diameter) hole in a solid rock face). Another interesting record was the capture of a *Planigale maculata* within rainforest when this species is usually considered to be an open forest species. It was unusual that no White-tailed Rats (*Uromys caudimaculatus*) were trapped or observed while spotlighting, since they have been recorded at Mount Elliot in the past, and are usually easy to trap and to spotlight.

Three species of birds recorded on Mount Elliot have not been recorded this far south before: Victoria's Riflebird, Bridled Honeyeater and Grey-headed Robin. These records increase the evidence of an affinity in the vertebrate fauna between the rainforest of Mount Elliot and tropical rainforest further to the north.

Mount Elliot is known to have a number of

endemic insect species, despite generally lower diversities than in the rainforests to the north (Graham, 1991). Mount Elliot is important in any biogeographical study of latitudinal trends in tropical biota, and greatly increases the local and regional biodiversity due to the inclusion of an area of tropical rainforest in an otherwise dry region.

COMMENTS ON TECHNIQUES

All sampling techniques have inherent biases that vary between taxa, seasons, habitats and weather conditions. Small mammals differ markedly in their relative trappability as illustrated by the capture of *Planigale maculata* in an insect formalin trap, which was not trapped in the small mammal traps. Pit traps (Mount Elliot, Mount Halifax) were found to be inefficient with respect to the effort required to install the pit lines. The pit traps were most useful in catching large ground dwelling invertebrates. Weather can have a large affect on observation biases with rain and/or mist making spotlighting and visual bird observations very difficult. Conversely, wet weather will increase the possibility of observing most amphibians and many reptiles. Most amphibians and reptiles are also less active during the winter months (dry season) making summer (wet season) sampling essential in tropical rainforests.

Habitat differences can have a drastic affect on the biases involved in most techniques. Dense vegetation makes visual observation of birds difficult and results in an increased importance of call identification. However, during these surveys it was found that, although most of the records were based on calls for the first two days, all bird species had been visually confirmed within five days. Dense vegetation also makes spotlighting for arboreal mammals very difficult, especially where there are no tracks or roads.

In summary, it is vital for vertebrate surveys to use as many different techniques as possible, and to sample during both wet and dry weather conditions to maximise the efficacy of the survey.

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APPENDIX 1

List of vertebrates observed during the fauna surveys of Mount Cleveland (Clv), Mount Hali-fax (Hal) and Mount Elliot (Ell). An index of abundance is given for mammals and birds for both the first and second field surveys (separated by a '/'). '-' — not observed, '0' — not ob-

served on this trip, '1' — uncommon/only seen once or twice, '2' — common/observed regularly, '3' — abundant/observed several times on every census, '*' — observed at least once at this site during the course of both surveys. Species names follow Ingram & Raven (1991).

SPECIES	COMMON NAME	Clv	Hal	Ell
MAMMALS				
Dasyuridae				
<i>Antechinus flavipes</i>	Yellow-footed Antechinus	-	2/2	-
<i>Antechinus stuartii</i>	Brown Antechinus	-	1/1	-
<i>Dasyurus hallucatus</i>	Northern Quoll	2/0	-	-
<i>Planigale maculata</i>	Common Planigale	-	-	0/1
Peramelidae				
<i>Isodon macrourus</i>	Northern Brown Bandicoot	2/2	-	-
<i>Perameles nasuta</i>	Long-nosed Bandicoot	-	1/1	-
Macropodidae				
<i>Macropus agilis</i>	Agile Wallaby	1/1	-	-
<i>Petrogale inornata</i>	Unadorned Rock Wallaby	1/1	-	-
Pteropidae				
<i>Nyctimene robinsoni</i>	Queensland Tube-nosed Bat	0/1	-	-
<i>Pteropus alecto</i>	Black Flying-fox	1/1	-	-
<i>Syconycteris australis</i>	Queensland Blossom-bat	1/0	-	-
Muridae				
<i>Melomys cervinipes</i>	Fawn-footed Melomys	3/3	3/3	2/2
<i>Mus musculus</i>	House Mouse	-	-	0/1
<i>Rattus fuscipes</i>	Bush Rat	-	3/3	3/2
<i>Uromys caudimaculatus</i>	White-tailed Rat	-	2/2	-
Suidae				
<i>Sus scrofa</i>	Feral Pig	1/1	2/2	2/2
BIRDS				
Casuariidae				
<i>Casuaris casuaris</i>	Southern Cassowary	-	1/1	-
Accipitridae				
<i>Accipiter fasciatus</i>	Brown Goshawk	-	0/1	-
<i>Accipiter novaehollandiae</i>	Grey Goshawk	1/0	-	-
<i>Aquila audax</i>	Wedge-tailed Eagle	1/1	0/1	0/1
<i>Haliastur indus</i>	Brahminy Kite	0/1	-	-
Falconidae				
<i>Falco peregrinus</i>	Peregrine Falcon	-	1/0	-
Megapodiidae				
<i>Alectura lathami</i>	Brush Turkey	1/1	2/2	2/1
<i>Megapodius freycinet</i>	Scrubfowl	-	1/0	1/0
Phasianidae				
<i>Synoicus australis</i>	Brown Quail	0/1	-	-
Columbidae				
<i>Chalcophaps indica</i>	Green-winged Pigeon	-	2/2	1/0
<i>Columba leucomela</i>	White-headed Pigeon	0/1	1/1	1/1

SPECIES	COMMON NAME	Clv	Hal	Ell
<i>Geopelia humeralis</i>	Bar-shouldered Dove	1/0	-	-
<i>Lopholaimus antarcticus</i>	Topknot Pigeon	-	1/0	1/0
<i>Macropygia amboinensis</i>	Brown Pigeon	-	2/1	2/1
<i>Ptilinopus magnificus</i>	Wompoo Pigeon	1/0	1/1	2/3
<i>Ptilinopus regina</i>	Red-crowned Pigeon	-	1/0	-
<i>Ptilinopus superbus</i>	Purple-crowned Pigeon	1/0	1/0	2/0
Loriidae				
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	-	0/1	-
Cacatuidae				
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	1/1	2/2	0/1
Psittacidae				
<i>Alisterus scularis</i>	King Parrot	-	1/1	-
<i>Platyercus elegans</i>	Crimson Rosella	-	2/3	-
Cuculidae				
<i>Centropus phasianinus</i>	Pheasant Coucal	3/3	-	-
<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo	-	1/1	-
<i>Cacomantis flabelliformis</i>	Fantail Cuckoo	-	0/2	0/3
Tytonidae				
<i>Tyto multipunctata</i>	Lesser Sooty Owl	-	0/1	-
Strigidae				
<i>Ninox boobook</i>	Boobook Owl	1/1	-	1/0
Podargidae				
<i>Podargus strigoides</i>	Tawny Frogmouth	1/0	-	-
Aegothelidae				
<i>Aegothales cristatus</i>	Australian Owlet Nightjar	1/0	—	-
Apodidae				
<i>Apus pacificus</i>	Fork-tailed Swift	-	1/0	-
Alcedinidae				
<i>Dacelo leachii</i>	Blue-winged Kookaburra	0/1	-	-
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	3/3	-	1/0
Meropidae				
<i>Merops ornatus</i>	Rainbow Bee-Eater	-	3/3	-
Pittidae				
<i>Pitta versicolor</i>	Noisy Pitta	-	3/3	3/0
Campephagidae				
<i>Coracina lineata</i>	Barred Cuckoo-Shrike	-	1/0	-
<i>Coracina tenuirostris</i>	Cicadabird	0/1	-	-
<i>Lalage leucomela</i>	Varied Triller	2/2	-	-
Orthonychidae				
<i>Orthonyx spaldingii</i>	Northern Logrunner	-	3/3	-
<i>Psophodes olivaceus</i>	Eastern Whipbird	-	3/3	-
Maluridae				

SPECIES	COMMON NAME	Clv	Hal	Ell
<i>Malurus elegans</i>	Red-backed Wren	1/0	-	-
Acanthizidae				
<i>Oreoscopus gutturalis</i>	Fernwren	-	1/1	-
<i>Gerygone mouki</i>	Brown Warbler	-	0/2	0/1
<i>Gerygone palpebrosa</i>	Fairy Warbler	2/2	0/1	-
<i>Sericornis citreogularis</i>	Yellow-throated Scrubwren	-	1/1-	
<i>Sericornis frontalis</i>	White-browed Scrubwren	-	2/0	3/3
<i>Sericornis magnirostris</i>	Large-billed Scrubwren	-	1/2	0/2
Monarchidae				
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	0/1	1/0
<i>Monarcha trivirgatus</i>	Spectacled Monarch	1/1	1/0	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	1/0	-	-
<i>Myiagra rubecula</i>	Leaden Flycatcher	2/1	-	-
<i>Rhipidura fuliginosa</i>	Grey Fantail	-	3/3	1/1
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	1/1	-
Eopsaltridae				
<i>Heteromyias cinereifrons</i>	Grey-headed Robin	-	3/3	3/3
<i>Tregellasia capito</i>	Pale-yellow Robin	-	3/3	2/3
Pachycephalidae				
<i>Colluricincla boweri</i>	Bowers Shrike-thrush	0/1	-	-
<i>Colluricincla megarrhyncha</i>	Rufous Shrike-thrush	3/3	1/1/1	
<i>Pachycephala pectoralis</i>	Golden Whistler	-	2/2	2/1
<i>Pachycephala rufiventris</i>	Rufous Whistler	-	1/0	-
<i>Pachycephala simplex</i>	Grey Whistler	-	1/0	1/0
Dicaeidae				
<i>Dicaeum hirundinaceum</i>	Mistletoebird	-	0/1	-
Meliphagidae				
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	-	2/3	1/0
<i>Meliphaga chrysops</i>	Yellow-faced Honeyeater	-	-	1/0
<i>Meliphaga frenatus</i>	Bridled Honeyeater	-	2/2	2/0
<i>Meliphaga gracilis</i>	Graceful Honeyeater	-	1/0	-
<i>Meliphaga notata</i>	Yellow-spotted Honeyeater	3/3	1/0	-
<i>Meliphaga lewinii</i>	Lewins Honeyeater	-	3/3	2/2
<i>Meliphaga lunatus</i>	White-naped Honeyeater	1/0	-	-
<i>Myzomela obscura</i>	Dusky Honeyeater	1/0	0/1	-
<i>Philemon novaeguineae</i>	Helmeted Friarbird	1/0	-	-
<i>Philemon corniculatus</i>	Noisy Friarbird	3/0	1/0	-
<i>Phylidonyris nigra</i>	White-cheeked Honeyeater	-	0/1	-
Estrildidae				
<i>Neochmia temporalis</i>	Red-browed Firetail	1/0	-	-
Dicruridae				
<i>Dicrurus bracteatus</i>	Spangled Drongo	1/0	-	-
Cracticidae				
<i>Sirepera graculina</i>	Pied Currawong	2/3	0/3	3/2
Ptilonorhynchidae				
<i>Ailuroedus melanotis</i>	Spotted Catbird	-	3/3	-
<i>Scenopoeetes dentirostris</i>	Toothbill Bowerbird	-	3/2	3/3
Paradisaeidae				
<i>Ptiloris victoriae</i>	Victoria's Riflebird	-	1/1	1/0

SPECIES	COMMON NAME	Clv	Hal	Ell
Corvidae				
<i>Corvus orru</i>	Australian Crow	2/0	-	-
REPTILES				
Gekkonidae				
<i>Gehyra dubia</i>		*	-	*
<i>Heteronotia binoei</i>	Bynoe's Gecko	*	-	-
<i>Oedura ocellata</i>		*	-	-
<i>Oedura rhombifer</i>		*	-	-
Pygopodidae				
<i>Lialis burtonis</i>	Burton's Legless Lizard	*	-	-
Scincidae				
<i>Carlia pectoralis</i>		*	-	-
<i>Carlia rhomboidalis</i>		*	-	-
<i>Carlia rubrigularis</i>		-	*	-
<i>Carlia schmelzii</i>		*	-	-
<i>Cyclodomorphus gerrardii</i>		-	-	*
<i>Egernia frerei</i>		*	-	-
<i>Sphenomorphus quoyii</i>	Water Skink	-	*	-
<i>Lampropholis basiliscus</i>		-	*	*
<i>Lampropholis coggeri</i>		-	*	-
<i>Lampropholis mirabilis</i>		-	-	*
<i>Sphenomorphus punctulatus</i>		*	-	-
Agamidae				
<i>Diporiphora australis</i>	Two-line Dragon	*	-	-
<i>Physignathus lesueurii</i>	Water Dragon	-	*	-
Varanidae				
<i>Varanus scalaris</i>	Spotted Tree-monitor	*	*	-
<i>Varanus varius</i>	Lace Monitor	-	-	*
Boidae				
<i>Morelia amethystina</i>	Amethystine Python	-	*	-
<i>Morelia maculosa</i>	Childrens Python	*	-	-
<i>Morelia spilota</i>	Carpet Python	*	-	*
Colubridae				
<i>Dendrelaphis punctulata</i>	Common Tree Snake	*	*	-
Elapidae				
<i>Acanthophis antarcticus</i>	Death Adder	-	-	*
<i>Demansia vestigiata</i>	Black Whipsnake	*	-	-
<i>Demansia psammophis</i>	Yellow-faced Whipsnake	-	-	*
<i>Demansia torquata</i>	Collared Whipsnake	*	-	-
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	-	*	-
<i>Pseudonaja textilis</i>	Eastern Brown Snake	*	-	-
<i>Rhinoplocephalus nigrescens</i>	Smalleyed Snake	-	*	-
AMPHIBIANS				
Bufo				
<i>Bufo marinus</i>	Cane Toad	*	*	*
Hylidae				
<i>Litoria caerulea</i>	Green Tree Frog	*	-	-
<i>Litoria fallax</i>		*	-	-
<i>Litoria gracilentia</i>		*	-	-

SPECIES	COMMON NAME	Civ	Hal	Ell
<i>Litoria leuseuri</i>	Stony-creek Frog	-	*	*
<i>Litoria nannotis</i>	Torrent Tree Frog	-	*	-
<i>Litoria rothii</i>	Red-eyed Tree Frog	*	-	-
Microhylidae				
<i>Cophixalus mcdonaldi</i>		-	-	*
<i>Cophixalus ornatus</i>		-	*	-
<i>Sphenophryne robusta</i>		-	*	-

APPENDIX 2

Results of small mammal trapping at each sub-site on Mount Cleveland, Mount Halifax and Mount Elliot. Data are the number of individuals caught per hundred trap nights at each trapping site. The results of each field trip (TRIP) are given separately.

MOUNT CLEVELAND					
SPECIES	TRIP	C1	C2	C3	C4
<i>Dasyurus hallucatus</i>	1	2.0	—	—	1.0
	2	—	—	—	—
<i>Isoodon macrourus</i>	1	2.0	2.0	1.0	2.0
	2	1.0	2.0	1.0	1.0
<i>Melomys cervinipes</i>	1	9.0	20.0	2.0	10.0
	2	19.0	23.0	6.0	21.0

MOUNT ELLIOT					
SPECIES	TRIP	E1	E2	E3	E4
<i>Melomys cervinipes</i>	1	1.1	3.2	2.2	—
	2	2.0	1.0	—	1.0
<i>Mus musculus</i>	1	—	—	—	—
	2	2.0	—	—	—
<i>Planigale maculata</i>	1	—	—	—	—
	2	—	—	1.0	—
<i>Rattus fuscipes</i>	1	4.3	2.2	4.3	5.4
	2	—	4.0	1.0	—

MOUNT HALIFAX						
SPECIES	TRIP	H1	H2	H3	H4	H5
<i>Antechinus flavipes</i>	1	3.8	—	2.5	2.5	—
	2	4.2	—	—	—	—
<i>Antechinus stuartii</i>	1	—	—	2.5	—	—
	2	2.1	—	—	—	—
<i>Melomys cervinipes</i>	1	1.3	—	—	5.0	10.0
	2	2.1	—	—	4.2	—
<i>Rattus fuscipes</i>	1	12.5	13.8	20.0	22.5	2.5
	2	16.7	14.6	18.8	8.3	29.2
<i>Uromys caudimaculatus</i>	1	2.5	1.3	1.3	—	—
	2	2.1	2.1	4.2	—	—